

REMARKS

Claims 1-32 are pending in this application. Claims 1, 7, 14, 18, 22, 26, 27, and 32 are amended. No new matter is added as a result of the above amendments. Reconsideration of this application in light of the above amendments and the following remarks is requested.

Allowable Subject Matter, Claim 3

Applicants thank Examiner Dang for the indication of allowable subject matter in claim 3. However, for the reasons set forth hereafter, Applicants respectfully submit that all of the claims are directed to allowable subject matter and that the application is in condition for allowance.

Rejection under 35 U.S.C. § 102(b), Claims 27 and 29-32

Claims 27 and 29-32 are rejected under 35 U.S.C. § 102(b) as being allegedly anticipated by U.S. Patent No. 6,323,519 to Gardner et al. ("Gardner"). This rejection is respectfully traversed.

The PTO provides in MPEP § 2131 that

"[t]o anticipate a claim, the reference must teach every element of the claim...."

Therefore, with respect to claim 27, to sustain this rejection the Gardner patent must contain all of the above claimed elements of the claim. However, contrary to the examiner's position that all elements are disclosed in the Gardner reference, the reference does not disclose performing a plasma treatment directly to said patterned gate material and directly to said substrate, wherein a gas based layer is formed over the patterned gate material and the substrate after performing the plasma treatment, as recited in claim 27 of the present disclosure. Figures 2-3 of Gardner are shown below:

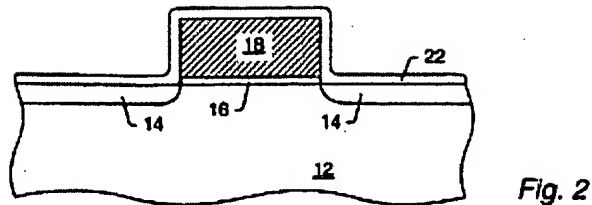


Fig. 2

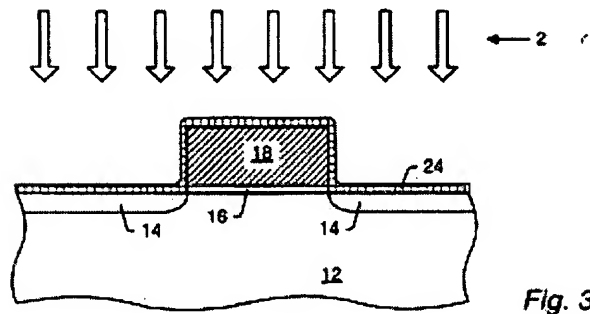


Fig. 3

As shown in Figure 2 above, Gardner discloses that a “thin conformal oxide 22 layer, having a thickness of between about 100 angstroms and 500 angstroms, is subsequently formed over gate conductor 18 and substrate 12, as shown in Fig. 2.” “Oxide 22 is preferably deposited by PECVD at a temperature about 400 degrees” (column 7, lines 44-48). “Oxide 22 may also be thermally grown” (column 7, lines 63-64). As shown in Figure 3 above, “oxide 22 is exposed to plasma treatment 2, such that nitride oxide 24 is formed” (column 8, lines 13-18). Thus, prior to performing the plasma treatment, the gas based layer, oxide layer 22, is already formed over the gate conductor and the substrate. Gardner does not perform a plasma treatment directly on the gate conductor and the substrate, wherein a gas based layer is formed over the gate material and the substrate after performing the plasma treatment. Gardner’s teaching is contrary to the present claimed invention as illustrated in Figures 5-6 of the current specification below.

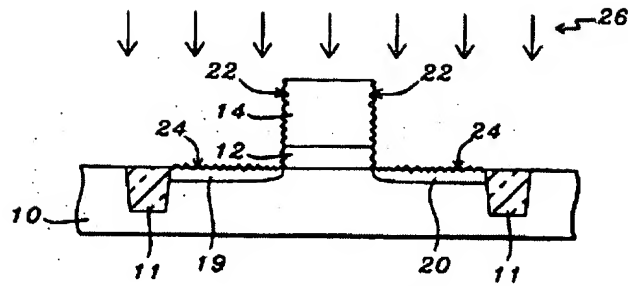


FIG. 5

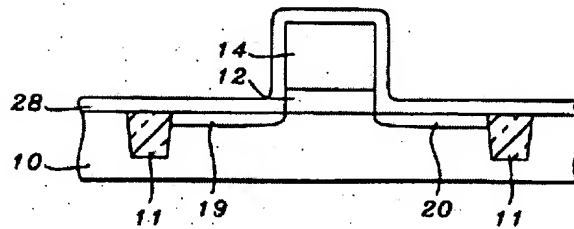


FIG. 6

As shown in Figures 5 and 6 above, after a plasma treatment 26 is performed directly on patterned gate material 22 and exposed substrate 24, a gas based layer 28 is formed over the patterned gate material 22 and substrate 24. Thus, Gardner's teaching is different from the present claimed invention in that Gardner discloses forming a gas based layer, oxide 22, before performing the plasma treatment instead of forming a gas based layer over the patterned gate material and the substrate after the plasma treatment is performed. Therefore, Gardner does not disclose the claimed features as recited in amended claim 27.

In view of the above, Applicants respectfully submit that Gardner does not disclose the features of claim 27. Claim 32 recites similar subject matter also not taught by Gardner. At least by virtue of its dependency on claim 27, Gardner does not disclose or suggest the features of dependent claim 29. Accordingly, Applicants respectfully request the withdrawal of the rejection of claims 27, 29, and 32 under 35 U.S.C. § 102(b).

Rejections Under 35 U.S.C. §103(a), Claims 7, 9-13, and 18-26

Claims 7, 9-13, and 18-26 are rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Gardner in view of U.S. Patent No. 6,387,735 to Ueda ("Ueda"). Applicants traverse this rejection on the grounds that these references are defective in establishing a prima facie case of obviousness with respect to claims 7, 9-13, and 18-26.

As the PTO recognizes in MPEP § 2142:

... The examiner bears the initial burden of factually supporting any prima facie conclusion of obviousness. If the examiner does not produce a prima facie case, the applicant is under no obligation to submit evidence of nonobviousness...

It is submitted that, in the present case, the examiner has not factually supported a prima facie case of obviousness for the following, mutually exclusive, reasons.

1. Even When Combined, the References Do Not Teach the Claimed Subject Matter

The Gardner and Ueda patents cannot be applied to reject claims 7, 9-13, and 18-26 under 35 U.S.C. § 103(a) which provides that:

A patent may not be obtained ... if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains ... (Emphasis added)

Thus, when evaluating a claim for determining obviousness, all limitations of the claim must be evaluated. However, since neither Gardner nor Ueda discloses performing a plasma treatment directly on the sidewalls of the gate electrode and directly on the exposed substrate, wherein a gas based layer is formed over the sidewalls of the gate electrode and the exposed substrate after performing the plasma treatment as is claimed in claim 7, and similarly in claims 18, 22, 26, it is impossible to render the subject matter of claims 7, 18, 22, 26 as a whole obvious, and the explicit terms of the statute cannot be met.

As discussed above in arguments presented for claim 27, Gardner does not disclose the feature of performing a plasma treatment directly on the sidewalls of the gate electrode and

directly on the exposed substrate, wherein a gas based layer is formed over the sidewalls of the gate electrode and the exposed substrate after performing the plasma treatment. Ueda also does not disclose such features. Ueda discloses that “a gate electrode...is formed on a semiconductor substrate,...and dose of ion implantation for forming the source region and the drain region is variably set according to the gate length measured value so that transistor characteristics relating to short-channel effect comes to a specific level” (abstract).

However, nowhere in the reference does Ueda disclose or suggest performing a plasma treatment on the sidewalls of the gate electrode and the exposed substrate. Ueda merely discloses that “with the gate electrode is used as a mask, LDD (lightly doped drain) implantation is performed, by which LDD region of low impurity concentration is formed on both sides of the gate electrode 4 on the N-channel side.” “On the P-channel side, with gate electrode 4’ used as a mask, halo implantation region 6’ of low impurity concentration is formed on both sides of the gate electrode 4” (column 6, lines 56-65). Since Ueda fails to disclose or suggest performing a plasma treatment, Ueda fails to disclose a gas based layer formed after performing the plasma treatment, as recited in claim 7, and similarly in claims 18, 22, and 26 of the present invention.

Even, *arguendo*, if a person of ordinary skill in the art were to combine the teachings of Gardner and Ueda, the resulting combination would not be performing a plasma treatment directly on the sidewalls of the gate electrode and directly on the exposed substrate, wherein a gas based layer is formed over the sidewalls of the gate electrode and the exposed substrate after performing the plasma treatment. Therefore, a person of ordinary skill in the art would not have been led to make the alleged combination of Gardner and Ueda.

Thus, for this mutually exclusive reason, the examiner’s burden of factually supporting a *prima facie* case of obviousness has clearly not been met, and the rejection to claims 7, 9-13, and 18-26 under 35 U.S.C. §103(a) should be withdrawn.

2. Prior Art That Teaches Away From the Claimed Invention Cannot be Used to Establish Obviousness

In the present case, the Gardner reference clearly teaches away from forming a gas based layer over the sidewalls of the gate electrode and the exposed substrate after performing the plasma treatment by specifically teaching forming an oxide layer over the gate material and the

substrate prior to performing a plasma treatment. Since it is well recognized that teaching away from the claimed invention is a *per se* demonstration of lack of *prima facie* obviousness, it is clear that the examiner has not borne the initial burden of factually supporting any *prima facie* conclusion of obviousness.

Thus, for this reason alone, the examiner's burden of factually supporting a *prima facie* case of obviousness has clearly not been met, and the rejection to claims 7, 9-13, and 18-26 under 35 U.S.C. §103(a) should be withdrawn.

3. The Combination of References is Improper

Assuming, arguendo, that none of the above arguments for non-obviousness apply (which is clearly not the case based on the above), there is still another, mutually exclusive, and compelling reason why the Gardner and Ueda patents cannot be applied to reject claims 7, 9-13, and 18-26 under 35 U.S.C. § 103(a).

§ 2142 of the MPEP also provides:

...the examiner must step backward in time and into the shoes worn by the hypothetical 'person of ordinary skill in the art' when the invention was unknown and just before it was made.....The examiner must put aside knowledge of the applicant's disclosure, refrain from using hindsight, and consider the subject matter claimed 'as a whole'.

Here, neither Gardner nor Ueda, either alone or in combination, discloses or suggests, the desirability of the combination since neither discloses performing a plasma treatment directly on the sidewalls of the gate electrode and directly on the exposed substrate, wherein a gas based layer is formed over the sidewalls of the gate electrode and the exposed substrate after performing the plasma treatment. Contrary to a gas based layer being formed after performing the plasma treatment, Gardner discloses forming an oxide layer before performing the plasma treatment. On the other hand, Ueda fails to mention anything about performing a plasma treatment, let alone a gas based layer being formed after performing the plasma treatment. Neither Gardner nor Ueda, either alone or in combination, discloses or suggests a gas based layer that is formed after performing the plasma treatment. Thus, it is clear that neither patent provides

any incentive or motivation supporting the desirability of the combination. Therefore, there is simply no basis in the art for combining the references to support a 35 U.S.C. § 103(a) rejection.

In this context, the MPEP further provides at § 2143.01:

The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination.

In the above context, the courts have repeatedly held that obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching, suggestion or incentive supporting the combination.

In the present case it is clear that the examiner's combination arises solely from hindsight based on the invention without any showing, suggestion, incentive or motivation in either reference for the combination as applied to claims 7, 18, 22, and 26. Therefore, for this mutually exclusive reason, the examiner's burden of factually supporting a *prima facie* case of obviousness has clearly not been met, and the rejection to claims 7, 9-13, and 18-26 under 35 U.S.C. §103(a) should be withdrawn.

Rejections Under 35 U.S.C. §103(a), Claims 1, 2, 4, 27, 28, 30-32

Claims 1, 2, 4, 27, 28, 30-32 are rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Gardner in view of U.S. Patent No. 5,425,843 to Saul et al. ("Saul"). Applicants traverse this rejection on the grounds that these references are defective in establishing a *prima facie* case of obviousness with respect to claims 1, 2, 4, 27, 28, 30-32.

As the PTO recognizes in MPEP § 2142:

... The examiner bears the initial burden of factually supporting any prima facie conclusion of obviousness. If the examiner does not produce a prima facie case, the applicant is under no obligation to submit evidence of nonobviousness...

It is submitted that, in the present case, the examiner has not factually supported a *prima facie* case of obviousness for the following, mutually exclusive, reasons.

1. Even When Combined, the References Do Not Teach the Claimed Subject Matter

The Gardner and Saul patents cannot be applied to reject claims 1, 2, 4, 27, 28, 30-32 under 35 U.S.C. § 103(a) which provides that:

A patent may not be obtained ... if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains ... (Emphasis added)

Thus, when evaluating a claim for determining obviousness, all limitations of the claim must be evaluated. However, since neither Gardner nor Saul discloses performing a plasma treatment directly on the patterned and etched layer of gate material and directly on exposed surfaces of the provided substrate, wherein a gas based layer is formed over the patterned and etched layer of gate material and the exposed surfaces of the provided substrate after performing the plasma treatment as is claimed in claim 1, and similarly in claims 27 and 32, it is impossible to render the subject matter of claims 1, 27 and 32 as a whole obvious, and the explicit terms of the statute cannot be met.

As discussed above in arguments presented for claim 27, Gardner does not disclose the feature of performing a plasma treatment directly on the patterned and etched layer of gate material and directly on exposed surfaces of the provided substrate, wherein a gas based layer is formed over the patterned and etched layer of gate material and the exposed surfaces of the provided substrate after performing the plasma treatment. Saul also does not disclose such features. Saul discloses “a post-etching treatment of a damaged etched semiconductor device” (column 1, lines 60-61). Saul’s process comprises “providing an unetched device having a plurality of layers including a silicon dioxide layer deposited or grown on the surface of a silicon layer in an etching area” (column 1, lines 62-65). “The unetched semiconductor device is then etched” (column 1, lines 65-68). “The untreated etched semiconductor device including the damaged silicon layer is treated with a post etching forming-gas plasma comprising hydrogen and nitrogen” (column 1, line 60 to column 2, line 10). Thus, similar to Gardner, Saul discloses

depositing or growing a silicon dioxide layer on the silicon prior to performing the plasma treatment. Therefore, Saul also fails to disclose the features as recited in claims 1, 27, and 32.

Even, *arguendo*, if a person of ordinary skill in the art were to combine the teachings of Gardner and Saul, the resulting combination would not be performing a plasma treatment directly on the sidewalls of the gate electrode and directly on the exposed substrate, wherein a gas based layer is formed over the sidewalls of the gate electrode and the exposed substrate after performing the plasma treatment. Therefore, a person of ordinary skill in the art would not have been led to make the alleged combination of Gardner and Saul.

Thus, for this mutually exclusive reason, the examiner's burden of factually supporting a *prima facie* case of obviousness has clearly not been met, and the rejection to claims 1, 2, 4, 27, 28, 30-32 under 35 U.S.C. §103(a) should be withdrawn.

2. Prior Art That Teaches Away From the Claimed Invention Cannot be Used to Establish Obviousness

In the present case, both the Gardner and the Saul references clearly teach away from performing a plasma treatment directly on the sidewalls of the gate electrode and directly on the exposed substrate, wherein a gas based layer is formed over the sidewalls of the gate electrode and the exposed substrate after performing the plasma treatment by specifically teaching forming an oxide layer over the substrate prior to performing a plasma treatment and depositing or growing a silicon dioxide layer on the silicon prior to performing the plasma treatment. Since it is well recognized that teaching away from the claimed invention is a *per se* demonstration of lack of *prima facie* obviousness, it is clear that the examiner has not borne the initial burden of factually supporting any *prima facie* conclusion of obviousness.

Thus, for this reason alone, the examiner's burden of factually supporting a *prima facie* case of obviousness has clearly not been met, and the rejection to claims 1, 2, 4, 27, 28, 30-32 under 35 U.S.C. §103(a) should be withdrawn.

3. The Combination of References is Improper

Assuming, *arguendo*, that none of the above arguments for non-obviousness apply (which is clearly not the case based on the above), there is still another, mutually exclusive, and

compelling reason why the Gardner and Saul patents cannot be applied to reject claims 1, 2, 4, 27, 28, 30-32 under 35 U.S.C. § 103(a).

§ 2142 of the MPEP also provides:

...the examiner must step backward in time and into the shoes worn by the hypothetical 'person of ordinary skill in the art' when the invention was unknown and just before it was made.....The examiner must put aside knowledge of the applicant's disclosure, refrain from using hindsight, and consider the subject matter claimed 'as a whole'.

Here, neither Gardner nor Saul, either alone or in combination, discloses or suggests, the desirability of the combination since neither discloses performing a plasma treatment directly on the sidewalls of the gate electrode and directly on the exposed substrate, wherein a gas based layer is formed over the sidewalls of the gate electrode and the exposed substrate after performing the plasma treatment. Contrary to a gas based layer being formed after performing the plasma treatment, Gardner discloses forming an oxide layer before performing the plasma treatment. Similar to Gardner, Saul discloses forming a silicon dioxide layer over the silicon prior to performing a plasma treatment. Neither Gardner nor Saul, either alone or in combination, discloses or suggests that a gas based layer is formed after performing the plasma treatment. Thus, it is clear that neither patent provides any incentive or motivation supporting the desirability of the combination. Therefore, there is simply no basis in the art for combining the references to support a 35 U.S.C. § 103(a) rejection.

In this context, the MPEP further provides at § 2143.01:

The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination.

In the above context, the courts have repeatedly held that obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching, suggestion or incentive supporting the combination.

In the present case it is clear that the examiner's combination arises solely from hindsight based on the invention without any showing, suggestion, incentive or motivation in either

reference for the combination as applied to claims 1, 27, and 32. Therefore, for this mutually exclusive reason, the examiner's burden of factually supporting a *prima facie* case of obviousness has clearly not been met, and the rejection to claims 1, 2, 4, 27, 28, 30-32 under 35 U.S.C. §103(a) should be withdrawn.

Rejections Under 35 U.S.C. §103(a), Claims 5-8, 10-17, and 22-26

Claims 5-8, 10-17, and 22-26 are rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Gardner in view of Saul and further in view of Ueda. Applicants traverse this rejection on the grounds that these references are defective in establishing a *prima facie* case of obviousness with respect to claims 5-8, 10-17, and 22-26.

As the PTO recognizes in MPEP § 2142:

... The examiner bears the initial burden of factually supporting any prima facie conclusion of obviousness. If the examiner does not produce a prima facie case, the applicant is under no obligation to submit evidence of nonobviousness...

It is submitted that, in the present case, the examiner has not factually supported a *prima facie* case of obviousness for the following, mutually exclusive, reasons.

1. Even When Combined, the References Do Not Teach the Claimed Subject Matter

The Gardner, Ueda and Saul patents cannot be applied to reject claims 5-8, 10-17, and 22-26 under 35 U.S.C. § 103(a) which provides that:

A patent may not be obtained ... if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains ... (Emphasis added)

Thus, when evaluating a claim for determining obviousness, all limitations of the claim must be evaluated. However, since Gardner, Ueda, and Saul, either alone or in combination, fail to disclose performing a plasma treatment directly on the patterned and etched layer of gate material and directly on exposed surfaces of the provided substrate, wherein a gas based layer is formed over the patterned and etched layer of gate material and the exposed surfaces of the

provided substrate after performing the plasma treatment as is claimed in claim 7, and similarly in claims 14, 22, and 26, it is impossible to render the subject matter of claims 7, 14, 22, and 26 as a whole obvious, and the explicit terms of the statute cannot be met.

As discussed above in arguments presented for claim 7, neither Gardner nor Ueda discloses or suggests performing a plasma treatment directly on the sidewalls of the gate electrode and directly on the exposed substrate, wherein a gas based layer is formed over the sidewalls of the gate electrode and the exposed substrate after performing the plasma treatment. As discussed above in arguments presented for claim 1, Saul also does not disclose such features. Therefore, Saul also fails to disclose the feature as recited in claims 7, 14, 22, and 26.

Even, *arguendo*, if a person of ordinary skill in the art were to combine the teachings of Gardner and Saul, the resulting combination would not performing a plasma treatment directly on the patterned and etched layer of gate material and directly on exposed surfaces of the provided substrate, wherein a gas based layer is formed over the patterned and etched layer of gate material and the exposed surfaces of the provided substrate after performing the plasma treatment. Therefore, a person of ordinary skill in the art would not have been led to make the alleged combination of Gardner, Ueda, and Saul.

Thus, for this mutually exclusive reason, the examiner's burden of factually supporting a *prima facie* case of obviousness has clearly not been met, and the rejection to claims 5-8, 10-17, and 22-26 under 35 U.S.C. §103(a) should be withdrawn.

2. The Combination of References is Improper

Assuming, *arguendo*, that none of the above arguments for non-obviousness apply (which is clearly not the case based on the above), there is still another, mutually exclusive, and compelling reason why the Gardner, Saul, and Ueda patents cannot be applied to reject claims 5-8, 10-17, and 22-26 under 35 U.S.C. § 103(a).

§ 2142 of the MPEP also provides:

...the examiner must step backward in time and into the shoes worn by the hypothetical 'person of ordinary skill in the art' when the invention was unknown and just before it was made.....The examiner must put aside knowledge of the applicant's disclosure,

refrain from using hindsight, and consider the subject matter claimed 'as a whole'.

Here, Gardner, Saul and Ueda, either alone or in combination, fail to disclose or suggest, the desirability of the combination since none of the references discloses performing a plasma treatment directly on the patterned and etched layer of gate material and directly on exposed surfaces of the provided substrate, wherein a gas based layer is formed over the patterned and etched layer of gate material and the exposed surfaces of the provided substrate after performing the plasma treatment. Contrary to a gas based layer being formed after performing the plasma treatment, Gardner discloses forming an oxide layer before performing the plasma treatment. Similar to Gardner, Saul discloses forming a silicon dioxide layer over the silicon prior to performing a plasma treatment. Ueda, on the other hand, fails to mention anything about a plasma treatment.

Nowhere in the references does Gardner, Saul, or Ueda disclose or suggest that a gas based layer is formed after performing the plasma treatment. Thus, it is clear that none of the patents provides any incentive or motivation supporting the desirability of the combination. Therefore, there is simply no basis in the art for combining the references to support a 35 U.S.C. § 103(a) rejection.

In this context, the MPEP further provides at § 2143.01:

The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination.

In the above context, the courts have repeatedly held that obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching, suggestion or incentive supporting the combination.

In the present case it is clear that the examiner's combination arises solely from hindsight based on the invention without any showing, suggestion, incentive or motivation in either reference for the combination as applied to claims 7, 14, 22, and 26. Therefore, for this mutually exclusive reason, the examiner's burden of factually supporting a *prima facie* case of obviousness has clearly not been met, and the rejection to claims 5-8, 10-17, and 22-26 under 35 U.S.C. §103(a) should be withdrawn.

Conclusion

It is clear from all of the foregoing that independent claims 1, 7, 14, 18, 22, 26, 27, and 32 are in condition for allowance. Dependent claims 2-6, 8-13, 15-17, 23-25, and 28-31 from and further limit independent claims 1, 7, 14, 18, 22, 26, and 27 therefore are allowable as well.

An early formal notice of allowance of claims 1-32 requested.

Respectfully submitted,

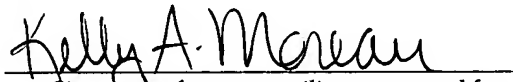


Wing Y Mok
Registration No. 56,237

Dated: 12/16/05

HAYNES AND BOONE, LLP
901 Main Street, Suite 3100
Dallas, Texas 75202-3789
Telephone: 214/739-8626
Facsimile: 214/200-0853
Client Matter No.: 24061.470/TS02-150
R121562

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